

Research Summary

Missouri Systemic Countermeasures to Improve Pedestrian Safety

The Missouri Department of Transportation (MoDOT) has successfully implemented systemic safety countermeasures in the past to reduce fatal and serious injury crashes related to roadway departure. The systemic safety approach manages the potential for crashes where crash densities may be low, making this an ideal method for addressing pedestrian safety across Missouri. With the increasing trend in pedestrian fatalities and serious injuries in Missouri, MoDOT initiated this project to develop a Pedestrian Safety Countermeasure Tool based on the analysis of statewide pedestrian-involved crash data and identification of situational trends.

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During the last ten years, pedestrian and bicyclist fatalities have increased 79 percent in Missouri while all other traffic fatalities have increased by 20 percent. With the systemic approach to pedestrian safety, locations with a high probability of pedestrian crashes are identified based on



exposure and risk factors, and countermeasures are implemented across the network based on those crash risks. The matrix-based Pedestrian Safety Countermeasure Tool identifies those peer groups (road segments and intersections) that have the highest risk of pedestrian crashes and the countermeasures that can be applied systemically across various jurisdictions.

Considering the objective of the research project, various pedestrian safety countermeasures were reviewed for applicability for systemic implementation. They were categorized according to their application at signalized and uncontrolled or unsignalized intersections, mid-block crossings, and for locations where pedestrians are at risk when walking along the roadway. The resulting list of countermeasures were prioritized by the MoDOT Research Technical Advisory Committee (TAC) and considered for applicability based on the data analysis results. This list was further refined during the Pedestrian Safety Countermeasure Tool development process. Many of those that can be implemented systemically are considered as proven safety countermeasures identified and endorsed by the FHWA through its Every Day Counts (EDC) initiative, Safe Transportation for Every Pedestrian (STEP). These range from reducing speed limits and adding walkways and sidewalks to adding high-visibility crosswalks and enhancements such as lighting and signing. Newer countermeasures such as Rectangular Rapid Flashing Beacon (RRFB),



Pedestrian Hybrid Beacon (PHB), and Leading Pedestrian Interval (LPI) were included as well.

Statewide geolocated pedestrian crash data from 2013-2021, excluding freeway segments, was analyzed. Analysis involved categorizing road segments, signalized intersections, and unsignalized intersections with at least one pedestrian crash into peer groups. These peer groups were defined based on land use (rural, urban, urbanized), number of lanes of a segment/legs of an intersection, and median type (roadway segments) or traffic control type (intersections). Distribution of different traffic volumes and speed limits were evaluated. The results were used to develop the Pedestrian Safety Countermeasure Tool and establish two priority peer groups.

The Pedestrian Safety Countermeasure Tool has three Excel spreadsheet matrices for signalized intersections, unsignalized intersections, and segments-midblock (undivided roads), a table for segments (corridor/parallel walking along the roadway), and the associated countermeasures that can be implemented systemically to reduce pedestrian-related crashes. The countermeasures identified in the tool can be systemically implemented individually, in combination with other treatments, or as a required suite of treatments. To facilitate implementation, priority peer groups and sub-categories are highlighted in the tool to help focus initial efforts and a series of pedestrian crash maps were developed using Geographical Information System (GIS) mapping for each Metropolitan Planning Area (MPO) in Missouri.

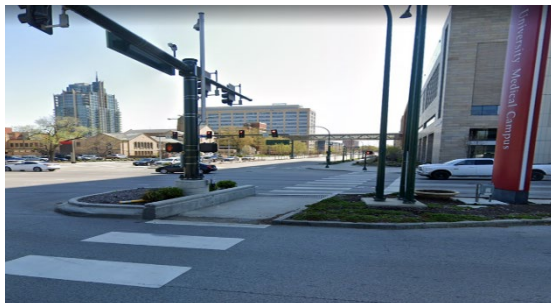


Figure 1: Pedestrian crossing in an urban area

Project Information

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Project Manager



CONTACT INFORMATION:

Jenni Hosey, AICP, PMP
Senior Research Analyst
Missouri Dept. of Transportation
1617 Missouri Blvd.
Jefferson City, MO 65109
(573) 526-4493
Jennifer.J.Hosey@modot.mo.gov

